British Columbia
Ministry of Forests

Rationale for Increase in Allowable Annual Cut (AAC) Determination

of
Merritt Timber Supply Area
Innovative Forestry Practices Agreements

Issued to
Tolko Industries Ltd.
Aspen Planers Ltd.
Ardew Wood Products Ltd.
Weyerhaeuser Canada Ltd.
Riverside Forest Products Ltd.
9135 Investments Ltd. (known as Stuwix Resources Ltd.)

Effective
January 1, 2004

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Southern Interior Forest Region

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Executive Summary

Section 59.1 of the *Forest Act* enables the Ministry of Forests (MOF) regional manager to increase the current allowable annual cut (AAC) associated with the licence of an innovative forestry practices agreement (IFPA) holder. An increase in AAC must be justified based on timber supply analysis methodology approved by the chief forester. Prior to determining an increase, the regional manager must have approved a forestry plan, which identifies the innovative forestry practices or activities. Eligible categories of innovative forestry practices and activities are described in the Innovative Forestry Practices Regulation.

On March 25, 1998, IFPAs were issued to five forest companies operating in the Merritt timber supply area (TSA). The IFPA-holders work through the Nicola-Similkameen Innovative Forestry Society (NSIFS). NSIFS recognized First Nations' community needs and assisted in pursuing a replaceable forest licence for a First Nation's owned company so they could share in the benefits from any increase in AAC that may occur. On December 1, 2001 a sixth IFPA was issued to 9135 Investments Ltd. (now known as Stuwix Resources Ltd.). NSIFS is to be commended for their involvement of First Nations.

NSIFS prepared the forestry plan for regional manager approval and co-ordinated implementation of a wide scope of innovative projects. These projects ranged from updating inventory and growth and yield information to mapping wildlife capability and First Nations' values. The society is commended for the scope of projects.

In the spring of 2003, information from five years worth of innovative forestry practices was assembled in an uplift application to the regional manager. The application from NSIFS requested an increase to the allowable annual cut (AAC) of the Merritt TSA by 549 000 m^3. The application contained a composite analysis that combined all innovative forestry practices that NSIFS considered relevant for their proposed AAC increase. Several months of detailed review ensued by government agencies, First Nations and the public. On September 25, 2003, a determination meeting was held with the regional manager and government agency staff to discuss the technical merits, risks and uncertainties of the application. Further meetings were held with staff experts to discuss the technical details and implications of each factor identified in the composite analysis.

After reviewing and considering all of the factors and associated uncertainties that are described in this document, the regional manager determined that innovative practices or activities under the IFPAs identify 330 700 m^3 per year from within the Merritt IFPA boundaries that would not have been known or made available within the current AAC for the Merritt TSA. This increase is assigned to the IFPA-holders as follows and is subject to conditions outlined in the 'Determination' section of this document;

A18695 – Aspen Planers Ltd. by 16 535 cubic metres per year;
A18696 – Tolko Industries Ltd. by 36 377 cubic metres per year;
A18697 – Riverside Forest Products Ltd. by 3 307 cubic metres per year;
A18698 – Weyerhaeuser Canada Ltd. by 76 061 cubic metres per year;
A18039 – Ardew Wood Products Ltd. by 19 015 cubic metres per year; and
A65006 – Stuwix Resources Ltd. by 179 405 cubic metres per year.

The determination is effective January 1, 2004 and will remain in effect until December 31, 2007. Recommendations are also made on several issues with the intention of reducing the uncertainty and risk with future applications and to ensure the intent of the forestry plan is met.

Objective of this document

This document is intended to provide an accounting of the factors that I, as regional manager of the Southern Interior Forest Region, have considered and the rationale that I have used in making my determination, under Section 59.1 of the *Forest Act*, of the request for an increase in allowable annual cut (AAC) of the replaceable forest licences FL A18695, A18696, A18697, A18698, A18039, and A65006 under Innovative Forestry Practices Agreements (IFPAs) in the Merritt TSA.

This document outlines the background of the Merritt IFPAs, statutory framework, guiding principles for the determination, the role of timber supply analysis in the process, the consideration of factors influencing the timber supply analysis, impacts on other licensees, First Nations' considerations, reasons for decision, determination, conditions and recommendations. The appendices contain the IFPA legislation, memorandum from the chief forester on timber supply methodology and information sources. This rationale does not identify all the work completed by the NSIFS but is intended to address the AAC uplift application and resulting determination needs.

Introduction of the Merritt IFPAs

In the Merritt timber supply area (TSA), IFPAs were issued on March 25, 1998 for a ten-year term to: A18695 – Aspen Planers Ltd.; A18696 – Tolko Industries Ltd.; A18697 – Riverside Forest Products Ltd.; A18698 – Weyerhaeuser Canada Ltd.; and A18039 – Ardew Wood Products Ltd. On December 1, 2001 a sixth IFPA was issued to; A65006 – 9135 Investments Ltd. (now known as Stuwix Resources Ltd.). All six IFPAs expire on March 24, 2008. The Nicola-Similkameen Innovative Forestry Society (NSIFS) acts on behalf of the above six IFPA-holders. A forestry plan was submitted by the NSIFS on July 14, 2000 and was approved by the regional manager with conditions on January 12, 2001. On December 31, 2001 NSIFS applied to the regional manager for an allowable annual cut increase as allowed under section 59.1 of the *Forest Act*. Following the review of the increase application, the process was postponed until supplementary information was received. On April 30, 2003 supplementary information was received and the process recommenced. During the review of the application, at the request of government staff, NSIFS provided further supporting information.

The Merritt IFPA area comprises approximately 1.13 million hectares and encompasses the whole Merritt TSA including the mountainous terrain and steep river valleys of the Cascade Mountains in the west and the relatively dry Thompson Plateau in the east. Administratively, the IFPA area is located in the Cascades Forest District within the Southern Interior Forest Region. The major population centres are Merritt and Princeton, where approximately 60% of the TSA's population reside. Other smaller communities include Tulameen, Brookmere, Missezula Lake, Douglas Lake, Lower Nicola, Osprey Lake and Allison Lake. Within the IFPA boundaries are the operating areas of the six IFPA holders, the B.C. Timber Sales Program (formerly the Small Business Forest

Enterprise Program), and five companies holding non-replaceable forest licences operating in smallwood Lodgepole pine stands.

Statutory framework

Section 59.1 of the *Forest Act* enables the regional manager to increase the current allowable annual cut associated with the licence of an innovative forestry practices agreement holder. Prior to such approval, the regional manager must have approved a forestry plan in which the innovative forestry practices or activities are identified.

Eligible categories of innovative forestry practices and activities are described in the Innovative Forestry Practices Regulation. These categories include improvements due to harvesting or silvicultural systems, silvicultural treatments, collection and analysis of new data on forest composition and expected growth, and management activities to enhance and protect other resource values. To be eligible the practices and activities must be within the forestry plan approved by the regional manager. Additionally, the collection and analysis of new data must be in accordance with the specifications of the chief forester.

An increase in AAC must be justified based on timber supply analysis methodology approved by the chief forester. The chief forester has made known his approved timber supply analysis methodology in a memorandum dated April 6, 2001 to the regional managers. This memorandum provides the general principles of timber supply analysis methodology that is required to justify an increase in allowable annual cut to the licence of an innovative forestry practices agreement holder.

Under section 59.1 of the *Forest Act*, the regional manager can limit an AAC increase to a period of time, area of land, type of timber or any other condition. The regional manager also can reduce or eliminate an increase at any future time given new information or for non-compliance with the forestry plan or the conditions set. Further, the regional manager is enabled to suspend or cancel an innovative forestry practices agreement if the holder is not complying with the agreement, forestry plan, conditions, *Forest Act*, or *Forest Practices Code of British Columbia Act*.

Section 59.1 of the *Forest Act*, the Innovative Forestry Practices Regulation, and the memorandum on timber supply methodology from the chief forester are reprinted in the appendices.

Guiding principles

As I expect to have to make a number of decisions with respect to Innovative Forest Practice Agreements under section 59.1 of the *Forest Act*, I have outlined the following guiding principles. These principles assist me in ensuring administrative fairness and consistency in how I approach my decisions.

- Increases in allowable annual cut must be justified by changes that have been identified due to an innovative practice or activity within the approved forestry plan. In my approval of the forestry plan, I may recognise that a practice or activity started prior to the approval (but after the IFPA is signed) is acceptable. This acceptance is primarily to accommodate the non-synchronisation of field seasons, funding, and my approval. I also recognise that an innovative activity may include new analysis of existing data or build upon existing knowledge where the existing data or knowledge would not be considered an innovative activity (e.g., data collected prior to forestry plan approval)
- For an innovative practice or activity to be considered in an AAC increase decision the practice or activity must be either currently implemented or the plans for the practice must be clear, practical, and feasible. Given the nature of innovative practices, I accept that some innovative activities presented may be at an initiation stage rather than a current practice stage.
- Innovative practices or activities identified in the approved forestry plan, but which are not addressed in an AAC increase request, need to be considered in the AAC increase determination. It is my expectation that the IFPA-holder will work towards implementing the forestry plan as approved. My approval is based on the whole plan not simply components that might result in increased timber supply. As such, I may weigh the risks of practices not yet carried out against identified increases presented to me.
- Any AAC increase decision should be made in the context of current government policy. While I may be aware of proposed policy changes that could impact an AAC increase decision, I must be mindful of the ever changing nature of proposed policy and not speculate on the acceptance of proposed policy. Similarly, it would be inappropriate for me to speculate on the impacts of strategic land-use or treaty processes before the decisions have been made by government and the appropriate implementation details have been determined.
- The most recent timber supply review for the management unit in which the IFPA is located provides the basis for describing current practice. This base may be updated with new information or management practices that are not innovative practices or activities. While I will not credit the IFPA-holder for increases in harvest flow associated with practices that are not defined as innovative in the forestry plan and regulation, I must consider impacts on the harvest flow of these updates in relation to the current allowable annual cut and to any benefits derived from innovative practices and activities.
- The right of the IFPA-holder's licence to access timber volume within the timber supply area is not affected by the IFPA unless otherwise agreed upon. I expect that

any increase in AAC will be harvested from within the IFPA boundaries in accordance with the information and practices identified in the IFPA review.

- An AAC increase awarded under the IFPA must not cause a negative impact on non-IFPA licensees operating within the IFPA boundaries without the approval of the non-IFPA licensee. The non-IFPA licensees can agree to manage their operating areas within the IFPA area in accordance with the IFPA forestry plan but are not eligible for any AAC increase. However, any AAC increase associated with innovative practices carried out under the IFPA forestry plan within the IFPA area can be attributable to the IFPA-holder, even if the activities are undertaken by a non-IFPA licensee.
- IFPA practices and activities can be assumed to apply to areas that are temporally excluded from the IFPA (e.g., timber licences, partitions outside of the IFPA-holder's licence) only after they have reverted to timber supply area status. Any increases in harvest flow identified on these stands before they revert will not be eligible under the IFPA. However, I recognise that these areas when they revert to TSA status are subject to licensee negotiations and, while the IFPA-holder does not have a specific right to harvest from such future stands, the IFPA-holder is as likely as others to obtain such rights. As such, I will consider these stands to be within the IFPA area at the time they revert.
- Uncertainty exists in the data and management practices presented and modelled in a review of timber supply. In my decision I must consider this uncertainty and associated risks and where necessary I can account for such.
    - One method to reduce risk is to periodically review the determination. As such, I will specifically assign a time period for which an AAC increase is applicable. Nevertheless, if prior to this time period, new information or an assessment of the innovative practices indicates that the increment is not justified or the licensee is not complying I have the right to remove or decrease any AAC increase that I may have determined.
    - A second method to reduce risk associated with an increased harvest flow is to award a lower AAC increase than the timber supply analysis suggests. The level of caution that I exercise will depend on the uncertainty of the timber supply increase being attributed to an innovative practice, which is normally related to the quality of the information on the practice, and to inherent uncertainties in ecological dynamics and biophysical factors.

With respect to First Nations' issues, I am aware of the Crown's legal obligations resulting from recent court decisions including those in the British Columbia Court of Appeal and the Supreme Court of Canada. The AAC increase that I may determine should not in any way be construed as limiting those obligations under these decisions, and in this respect it should be noted that my determination does not prescribe a particular plan of harvesting activity within the Merritt IFPA area. In my decision, I have considered all information brought forward respecting First Nations' interests. If, subsequent to this determination, I become aware of information respecting First Nations' interests that was not available to me at the time of this decision and indicates that all or part of the allowable annual cut increase was not justified, I may re-visit my determination.

My acceptance of information on practices within this decision does not supersede or fetter other statutory decision-making authorities, and is not to be construed as approval required by any other authority or agency.

In making my decision, I am aware of my obligations as a steward of the forest land of British Columbia and of the mandate of the Ministry of Forests as set out under the relevant legislation.

The role of timber supply analysis

Section 59.1(7) of the *Forest Act* identifies that an increase in allowable annual cut must be justified according to timber supply analysis methodology approved by the chief forester. The chief forester has made known this methodology in a memorandum dated April 6, 2001. The memorandum provides the general principles, not detailed procedures, of timber supply analysis that I have required be present in the AAC increase application and from which I have based my decision.

The timber supply analysis consists of two components. The first component is an information package that includes information from three categories; land base and inventory, timber growth and yield, and management practices. The second component is a suite of timber supply forecasts based on the information package that investigates different harvest flow options and data uncertainty.

To determine an increase in AAC requires that I have both knowledge of timber supply based on current practices and of the changes associated with the IFPA innovative practices and activities. As such, the timber supply analysis provides separate forecasts without and with IFPA innovative practices and activities.

I assume that the information from the 2001 timber supply review (TSR 2) of the Merritt TSA as described by the chief forester in his 2001 AAC determination represents the current status of the land base and management within the Merritt TSA. I also accept that this current status can be updated by new or specific information about the IFPA area. I discuss adjustments in information under 'Consideration of factors influencing timber supply analysis'. Adjustments are made based on my informed judgement of the information that is currently available to me. This information includes changes to the AAC increase request since the original request dated December 31, 2001 was presented.

The timber supply analysis with which I am provided is an integral component to my review of the AAC increase application. However, the determination itself is not a calculation but a synthesis of judgement and analysis in which numerous risks and uncertainties are weighed. Technical analytical methods such as computer models cannot incorporate all the social, cultural, and economic factors that are relevant when making forest management decisions. As such, depending upon the outcome of these

considerations the increase in AAC determined may or may not coincide with the original IFPA review analysis.

In this rationale, I will discuss many of the timber supply analysis assumptions in the context of my considerations for this determination. However, I may not discuss my considerations in detail about a factor where I am satisfied that the factor is appropriately modelled and described in the timber supply analysis report of the supplement to the AAC increase application. Nevertheless, I may elaborate on appropriately modelled factors for reasons such as high level of public input or lack of clarity in the analysis report.

Consideration of factors influencing timber supply analysis

The chief forester in his memorandum of April 6, 2001 identifies that information quality must be evaluated on a case by case basis. Below, I identify specific areas that are of concern to me.

Timber supply analysis overview

The supporting documentation for the original December 31, 2001 application for an AAC increase comprised of four components: (1) Benchmark analyses; (2) Updated TSA Analyses; (3) Innovative practices analyses; and (4) Sensitivity analyses of composite innovative practice analyses.

The first component, the benchmark analyses was comprised of a two-step process. First, a base harvest flow using the forest estate model FSSIM was determined with identical management assumptions to TSR 2 (Scenario A). This ensured that the data and assumptions are similar to TSR 2 and the analyses found that the base harvest flow could be repeated. Second, a base harvest flow with the forest estate model CASH6 was determined using the same data and management assumptions except explicit adjacency constraints were applied for the first 30 years (Scenario B).

The second component was an analysis that updated Scenario B with information and management that can be considered current management but are not innovative forestry practices and activities (TSA-like analysis or Scenario C). This was the base case against which increments due to innovative forestry practices or activities were compared.

The third component updated Scenario C with information and management assumptions to enable modelling of the innovative forestry practices and management objectives. To demonstrate and understand the impacts of various innovative practices and activities, a variety of analyses were completed (Scenarios D to K). Scenario K or the IFPA-like analysis was the composite analyses that combined all innovative forestry practices that NSIFS considered relevant for their proposed AAC increase.

The fourth component was the sensitivity of the harvest flow around various information and parameters in the model. NSIFS completed sensitivities around the composite Scenario K.

NSIFS presented twelve scenarios to provide the basic information to understand the impacts of the innovative practices determination major individual factors. Upon review of the application, my staff requested further analysis to understand the harvest flow dynamics and to clarify the impacts of individual innovative practices and activities.

I am satisfied that the above TSA-like and IFPA-like base harvest flows provide a suitable basis from which to evaluate the assumptions regarding the land base, management practices, timber yields, and the impacts of the innovative practices for the Merritt IFPA area. I accept that the analysis sufficiently follows the chief forester's standards for timber supply methodology as outlined in the April 6, 2001 memorandum to the regional managers. The acceptance of the analysis is based on the understanding of the balance between detail, cost, and the ability to handle uncertainty within the regional manager's Section 59.1 decision.

The model

Timberline Forest Inventory Consultants (Timberline) under the direction of the NSIFS prepared the timber supply analysis for the Merritt IFPA. Timberline used its proprietary timber supply model Critical Analysis of Schedules for Harvesting -version 6 (CASH6). This model can be used to project spatially implicit or spatially explicit timber supply forecasts. Spatially explicit means that the model accounts for the spatial relationship between mapped cutblocks while spatially implicit means that the model does not track cutblocks. Thus, a spatially explicit model enables direct implementation of adjacency rules associated with 'green up' forest cover constraints whereas a spatially implicit model approximates adjacency by constraints such as maximum disturbance.

For this analysis, the licensee used CASH6 in both spatially explicit and spatially implicit modes. The spatially explicit cutblock adjacency rule was applied for the first three decades after which a spatially implicit forest cover requirement was applied. These methods are discussed further throughout this document.

For the 2001 Merritt TSA timber supply review the forest estate model FSSIM version 3.0, developed by the MOF, was used in a spatially implicit mode. FSSIM was also used in the previous timber supply review that provided information for the 1996 AAC decision. As my decision must consider an increase in AAC above the decision made by the chief forester, I am mindful of differences in harvest flows that might be the result of different forest estate modelling methodology.

In the chief forester's April 6, 2001 memorandum, he identifies the importance of understanding the characteristics of the forest estate model and of benchmarking the

model against FSSIM. The applicant benchmarked the data and model against the timber supply analysis of the most recent timber supply review (TSR 2).

Based upon my staff's experience in examining results from the CASH6 model, I am satisfied that the model is capable of providing adequate projections of timber supply for my decision on the incremental effects of the innovative practices and activities and accept. In my consideration of other factors, described below, I am mindful of the potential differences in forecasts between models.

Land base

As part of the process used to define the timber harvesting land base in the timber supply analysis, a series of deductions are made from the productive forest land base. These deductions account for the factors that effectively reduce the suitability or availability for harvest of the productive forest area for ecological, economic or social reasons. The deductions in the Merritt IFPA review analysis resulted in a current timber harvesting land base of 678 250 hectares.

I have considered all of the deductions applied in the derivation of the timber harvesting land base for the Merritt IFPA area. I am satisfied that the following were appropriately modelled and will not discuss them in detail: protected areas, environmentally sensitive areas, problem forest types, and roads, trails and landings.

The factors discussed below are those for which I believe my consideration requires some documentation.

TSA boundaries

In the application the NSIFS used the same boundaries for the Merritt TSA as were used in the TSR 2 basecase. Since this time there has been a refinement of TSA boundaries and the new coverage has approximately 901 ha. more gross area. The resulting change in composition (e.g. the amount of THLB) is not known. This change impacts both the base TSA-like and the IFPA-like scenarios. I have accepted the use of the previous boundaries but am mindful of the small, unquantified upward pressure on all harvest flows.

Operability mapping

NSIFS indicated no change in operability mapping for the IFPA area. The information package shows a sequential netdown decrease of 1,958 ha from the TSR 2 benchmark using FSSIM to the TSR 2 benchmark using CASH 6. The NSIFS indicates the difference in operability and terrain stability information relates to differences in sliver polygon elimination procedures. With FSSIM an aggressive sliver elimination process was used that reduced the number of polygons but resulted in numerous spatial artefacts.

With the CASH 6 model a less aggressive sliver elimination process was used that maintained the correct attributes. Based on the advice of MOF staff, I accept this explanation and the operability and terrain stability information. As such, for this determination, I accept the assumptions about economic and physical operability as incorporated in the analysis.

Woodlot licences

In their application, NSIFS used similar woodlot information to that used in the TSR 2 basecase. In the January 1, 2002 AAC determination, the chief forester identified that 8 700 m^3/year was deleted from the AAC to account for woodlots issued since the previous AAC determination. This volume was considered in the TSR 2 base case as well as all IFPA scenarios.

Since the January 1, 2002 determination there have been three "top ups" to woodlots consisting of about 596 ha. of gross area. New AACs have been calculated for two licences (total change 470 m^3/year) and one AAC is pending. Woodlot 392 which was present in the TSR 2 and the NSIFS analysis, has been deleted (391 ha. of schedule B lands). The result is the new coverage for woodlots is known to be about 205 ha. larger in gross area for schedule B lands in the Merritt TSA.

I accept the netdown of woodlots and timber flows as modelled but recognize that there is a small downward impact equal to the increment associated with yield attributable to the 205 ha. more gross area in the NSIFS analysis.

Forest inventory

A Vegetation Resource Inventory (VRI) phase II was initiated by NSIFS under section 2(e) of the IFPA regulation to increase confidence in the forest inventory, improve understanding of Douglas-fir forest types and address concerns on high elevation spruce forests. The inventory was completed in 1999/2000 with 125 VRI plots being established in the vegetated treed stratum of the TSA. MSRM staff established the sample selection criteria and ground sampling was completed according to standards.

The VRI Phase II report concluded a 6% increase if volume adjustment ratios were not stratified by species groups and a 9% increase if volume adjustment ratios were stratified by species groups. NSIFS applied the results as a 6% increase across all yield tables. Ministry of Sustainable Resource Management (MSRM) staff agrees that the VRI phase II sampling indicates a 6% underestimate of inventory volume and suggests the averaging of the yield table may be a cautious approach.

Concerns about the appropriate representation (e.g. species, age) were raised. In a review of the set by major leading species and age class, MSRM identifies (a) Lodgepole pine leading stands are underestimated (17-18%) while balsam/spruce and Douglas-fir stands

are overestimated and (b) younger age classes (20-60, 61-100, and 101-140) are overestimated while the oldest (141+) stands are underestimated. MSRM indicates that these trends are typical of results found elsewhere.

The MSRM recommended method, the Fraser protocol, was not presented as concerns were identified by the contracted timber supply analyst that the resulting yield tables may be incorrect, causing inappropriate harvest flows. The documentation in the application did not provide sufficient background (1) to determine why the Fraser protocol was inappropriate and (2) to demonstrate that 6% is an appropriate adjustment instead of the Fraser protocol or the identified 9% based on species stratification. I am also mindful that the 6% increase in existing stand yield tables results in an 11% short-term and 2% long-term increase in harvest.

The 6% increase was applied incorrectly to existing managed stands in the analysis scenario that isolated the inventory impacts. However, in the IFPA-like analysis this error was corrected so only existing natural stand yield tables were increased by 6%.

Regional Net Volume Adjustment Factors (NVAF) were used in lieu of local estimates following recommendations of MSRM staff. The Merritt NVAF program is approximately 50% completed. MSRM identified that the use of regional NVAF's may underestimate the amount of timber supply that may be present.

I will discuss my accounting for this factor under 'Reasons for decision'.

Growth and yield

The timber supply methods used in this analysis require that matrices of volume yield over time for specific stand and management regimes are developed. Growth and yield models were used to develop these yield tables. These models require specific information related to the existing forest inventory and management, and to the expected future productivity of forested sites.

I have considered the expert advice of MOF and MSRM staff presented to me on inventory, management, and the expected rate of growth. I am satisfied that the analysis assumptions result in appropriate yield estimates except for the factors discussed below for which I believe my consideration requires some documentation.

Site productivity (low elevation)

Site index is a measure of the potential productivity of forested land and typically applies to areas of even-aged management. Site index is used as an input variable to growth and yield models to predict the rate of growth of existing managed stands and stands to be regenerated after harvesting.

NSIFS conducted a site index adjustment project for the low elevation even-aged stands. The project included (a) an assignment of potential site indices based on available information (b) a statistically based field sample, and (c) an adjustment to the assigned potential site indices based on the field sample.

MSRM indicates that the site index adjustment information represents an improvement over TSR 2 as it uses local studies to address managed stand site indices. There were concerns expressed with the project design and results, which raise risk and uncertainty. The study constrained the sample selection to current Lodgepole pine stands and samples may not represent all future managed stand regimes. The ground sampling population (16-40 year old Lodgepole pine leading stands) is only 2% of the landbase to which the resulting adjustment is applied. The predetermined use of only Lodgepole pine for site index estimates requires the use of species conversion equations and does not enable any ground comparison for these species.

The actual increment associated with this new site productivity information will not be realized until managed stands are harvested. The analysis demonstrates that existing stands may be harvested more rapidly as future stands modelled with the new site productivity information become available for harvest sooner.

The analysis identified increases in harvest flow due to improved site productivity estimates of approximately 420 000 m^3 in the short-term, 582 000 m^3 in the mid-term and 662 000 m^3 in the long-term. I recognize that changes in other factors in short, mid and long-term will affect the ability to capture the short-term AAC increment identified for this factor.

In consideration of the above, I accept the low elevation site index adjustment project as improved information. I am mindful of the uncertainty given the sample population and that short-term gains are the result of improved predicted yields in mid- and long-term.

I will discuss my accounting for this factor under 'Reasons for decision'.

Site productivity (high elevation)

NSIFS conducted a site index adjustment project for the high elevation even-aged stands (>1,650 metres above sea level.). This project included an assignment of the potential site indices based on the available information and an adjustment based on an "elevation model". No statistically based local field sample was completed to adjust the assigned potential site indices.

Site index estimates used in the Engelmann Spruce-Subalpine Fir (ESSF) were based on expert opinion, as this area was not included in the site index adjustment population. These estimates pose a higher risk than site index estimates, which were statistically adjusted in the low elevation areas. However, comparison of the preliminary site index estimates with limited field data collected in the high elevation ESSF suggests that they

are reasonable. The NSIFS notes their commitment to validating the site index information used in the analysis and future projects that are being considered. The analysis demonstrated no difference in harvest flow between the use of preliminary site index estimates and the inventory site index estimates in the high elevation ESSF.

It is my view that the high elevation site index adjustment project has insufficient sampling to determine appropriate site indices. However, I acknowledge that preliminary results indicate no or minimal impact on harvest flow is present. Therefore, I will not consider the site productivity – high elevation project further in my reasons for determination. I encourage NSIFS to continue with validation and completion of the site index adjustment project.

Site productivity (smallwood)

The chief forester acknowledged in the TSR 2 rationale that "the trend towards increased site productivity is clear based on studies and field observation", and that "it is highly reasonable to expect that most second growth stands will grow more quickly than productivity estimates from old-growth stands would suggest". He recognized an upward pressure in timber supply over the mid-term to long-term in the TSR 2 AAC determination due to a likely general underestimation of site index (including smallwood).

NSIFS investigated determining site indices for this stratum by several methods and settled for use in the timber supply analysis, a methodology that used site productivity information from the low elevation site index adjustment project in conjunction with available information on the smallwood strata. The application analysis indicated a mid-term (72 085 m^3) and long-term (106 253 m^3) impact due to this new information. Timberline indicated there are no constraints that prevent shifting these gains to the short-term as an even distribution of 90 000 m^3 per year is possible across all time horizons.

MSRM has indicated that using this approach to estimate the site indices of smallwood stands contains a good deal of risk and uncertainty. To provide greater certainty, smallwood stands need to have a representative and adequate sample from within their target population as the portability of the low elevation information is unknown. I am mindful that there may be some overlap with the low elevation site index adjustment project.

I am also mindful that the IFPA-holders do not have harvest rights to the smallwood strata and that the capture of the future site productivity gains is dependent on the harvest by other licensees and the appropriate regeneration of such areas.

In consideration of the above, I accept NSIFS's investigation of site productivity in the smallwood stratum as an improvement to TSR 2. I am mindful that the methods used do not fully address the uncertainty around site productivity in this stratum. I encourage

NSIFS to reduce this uncertainty in the future by improving upon their information with an approved sampling design and monitoring system.

I will discuss my accounting for this factor under 'Reasons for decision'.

Silviculture regimes

In their application, NSIFS used silviculture regimes for managed stands that were based upon a survey of the major licensees' practices of the past three years as related to site series. This information was used to create input for managed stand yield tables for both the TSA-like and IFPA-like scenarios.

Cascades Forest District staff expressed concern that the results were based on questionnaire results rather than data summaries. Staff believe that regeneration delay should be closer to 2.5 years than the 3.4 years used. There were also concerns that in the past two years licensees have not followed the agreed strategies relating to backlog and current fire restoration.

The impact of the changed regimes is not known, however, the benchmark analyses indicate no major change in harvest flow as compared to the analyses with regimes as modelled in TSR 2.

In future timber supply analyses, the impacts of major changes in the silviculture management regime from the previous timber supply review should be determined. Prompt reforestation of all disturbances, including fires, are important to ensure managed stands remain growing at rates identified. If disturbances are not promptly reforested and growing at rates identified, there will be effects on increment, timing and harvest flow.

In consideration of the above uncertainties and lack of specific information with respect to regeneration delay and disturbances, I believe that the changes likely balance given. As such, I will not account for these in my decision. However, I strongly encourage IFPA-holders to promptly reforest all disturbances including fires.

Single tree selection

The NSIFS recognized opportunities associated with management of dry-belt Douglas-fir stand types. Growth and yield studies suggest these stands are growing at higher rates. In the TSR 2 rationale, the chief forester encouraged the continued monitoring of selectively managed Douglas-fir stands to assess their contribution to timber supply in future determinations.

NSIFS used 'SINGROW' to generate yield tables in the timber supply analysis that followed a specified harvest cycle. SINGROW is a proprietary volume increment model developed by J.S. Thrower & Associates Ltd. using the MOF Prognosis model together

with permanent sample plots previously sampled in the Merritt TSA. Such modelling that uses localized information should offer an improvement over the modelled yields used in TSR 2, however, validation and peer review documentation was insufficient to determine with certainty if improvements were present.

'SINGROW' was utilized in the latest timber supply review for Tree Farm Licence (TFL) 8, and the licensees expressed no concern about its implementation. MSRM expressed some concerns regarding its use for the TFL 8 review. However, no specific accounting was made for the use of SINGROW in the determination.

In the Merritt IFPA analysis, I am aware that while yield values were higher than used in the previous timber supply review problems were noted with the implementation of the harvest cycle within the CASH 6 model. The IFPA-like analysis indicated a negative impact on harvest when the proposed innovative yield tables and management regimes are used. The presented harvest flows showed no short-term impact, 162 191 m^3 less in the mid-term and 114 134 m^3 less in the long-term. NSIFS suggests that harvest flow from the single tree management zone than is lower than should be expected to occur operationally. However, no information was provided to directly support a higher harvest flow. Additionally, no direct information was provided on the possibility or amount that could be flowed into the short-term as related to the mid- and long-term impacts.

In consideration of the above, I accept the timber supply analysis associated with the use of the SINGROW model. However, I am mindful that the contribution of single tree selection may be underestimated as stated by NSIFS. Nevertheless, the application provides insufficient documentation, validation, or peer review of the model or associated yields to judge such.

I will discuss my accounting for this factor under 'Reasons for decision'.

Tree improvement

The *Forest Practices Code of British Columbia Act* requires the use of improved (class A) seed from seed orchards for regeneration where available. Class A seed is the product of British Columbia's forest genetics program, which uses naturally occurring, well-performing trees and standard breeding techniques to produce trees with improved attributes, including enhanced growth.

In the TSR 2 AAC rationale, the chief forester acknowledged that current use of genetically improved seed provided an upward pressure in timber supply (increasing the long-term harvest level by 2.1%). NSIFS incorporated genetic gains into both the TSA-like and IFPA-like scenarios based on information from information on current known gains from Tree Improvement Branch. This recognized that the use of improved stock is not an eligible innovative practice and that the improved modelling of genetic gain was not identified as an innovative practice in the forestry plan.

NSIFS modelled tree improvement based on estimates of genetic gain of current production (i.e., not higher future expectations) and on the current use of improved seed within the Merritt timber supply area.

In consideration of the above, I accept the modelling of genetic gains as presented but I am mindful that with increased use of Class A seed and future genetic gains it is likely further yield gains will occur.

Forest health management

Since the TSA is characterized by an abundance of mature and over-mature Lodgepole pine, it is certain that mountain pine beetle will continue to be a major forest management issue. In the TSR 2 AAC rationale, the chief forester encouraged district and licensees to continue aggressive control efforts and ongoing salvage of mountain pine beetle damaged timber. MOF district staff expressed concern that the potential for mountain pine beetle to have short and long-term impacts to the TSA may be higher than current beetle infestation conditions suggests.

There is also concern that potential downward pressures from root diseases may be underestimated in the analysis. The analysis did not make any special considerations for root disease impacts nor provide information to suggest the impact.

In their forestry plan NSIFS identify innovative forestry practices and activities related to forest health. These activities have not bee included in this application.

I am mindful of the potential downward impacts due to unquantified forest health issues. Also, I am mindful of the potential need to increase harvest levels to manage for forest health issues such as mountain pine beetle management. In consideration of the above, I am recommending that NSIFS complete or initiate the forest health activities identified within the approved forestry plan. Where possible such information and associated modelling should be made available for the next timber supply review.

I will discuss my accounting for this factor further under my 'Reasons for decision' for harvest flow.

Non-recoverable losses

In the TSR 2 AAC rationale, the chief forester noted the assumptions appeared to overestimate the amount of non-recoverable losses. The chief forester also identified an overlap between inventory adjustments for the Lawless Creek fire, and harvesting of fire damaged timber under the conventional AAC. In the AAC determination, the chief forester accounted for an upward pressure in timber supply of 1.8% to address these issues. The above issues have not been factored into the IFPA-like analysis, but represent an upward pressure in timber supply.

In consideration of the above, I am mindful that an upward pressure equivalent to the over-estimate of non-recoverable losses should be considered for all scenarios. Correction for non-recoverable losses as modelled on both TSA-like and IFPA-like analysis can be considered to cancel each other in terms of an AAC increase. Therefore, an increase in volume due to innovative forestry practices regarding non-recoverable losses cannot be considered.

Natural stand yield tables (NSYT)

In the application, NSIFS developed polygon specific analysis units as opposed to using highly aggregated analysis units based on averaging yield curves. This should be considered an improvement in the level of spatial resolution. However, I note that the characteristics of each polygon to develop the yield curves are still subject to the variations of the inventory. It should also be recognized that some uncertainty around net volume prediction exists as the NVAF study has not been completed for the Merritt TSA and net volumes were adjusted with a regional estimate.

In consideration of the improved data and methodology outlined above, I accept the natural stand yield tables as used in the timber supply analysis.

Managed stand yield tables (MSYT)

Individual MSYT's were developed for each forest cover/PEM entity resultant polygon, and applied to both existing managed stands and all future stands. To reduce the number of yield curves for subsequent analysis, aggregation of similar shaped yield curves was defined by a set of attributes. The development of polygon specific yield curves represents an improvement in the level of resolution used in the data and is considered an innovative practice.

With the incorporation of local site index adjustment information, the managed stand yield tables represent an improvement over TSR 2. I am aware that NSIFS increased the 13% operational adjustment factor (OAF) 1 used in the 'December 31, 2001 AAC increase application' to the provincial default 15% based on a request from Forest Analysis Branch. I am also aware of the concern that the OAFs (15% and 5%) for stands greater than 25 years may not be appropriate as they do not adequately account for forest health issues such as root disease, dwarf mistletoes, stem diseases on young and older Lodgepole pine stands, and foliar diseases.

In consideration of the above, I accept the managed stand yield tables in all scenarios for use in the timber supply analysis. I am mindful of the forest health concerns that may not be accounted for in the provincial operational adjustment factors. I am also mindful of the recommendations for site productivity, single tree selection, and silviculture regimes.

Forest management practices

The MOF is required under the *Ministry of Forests Act* to manage, protect and conserve the forest and range resources of the Crown and to plan the use of these resources so that the production of timber and forage, the harvesting of timber, the grazing of livestock and the realisation of fisheries, wildlife, water, outdoor recreation and other natural resource values are co-ordinated and integrated. Accordingly, the extent to which management practices for various forest and non-forest resources and values affect timber supply must be considered in AAC determinations.

To manage for resources such as water quality and aesthetics, current harvesting practices prescribe the size and shape of cutblocks, the amount of disturbance (areas covered by stands of less than a specified height), and minimum green-up heights for regenerated stands on harvested areas before adjacent areas may be harvested. Green-up requirements provide for a distribution of harvested areas and retention of forest cover in a variety of age classes across the landscape.

I have reviewed the information presented to me about forest practices and management assumptions for community watersheds, conversion of grasslands and elk movement corridors and I am satisfied that IFPA review analyses appropriately reflected current practices.

The factors discussed below are those for which I believe my consideration requires some documentation.

Predictive ecosystem mapping (PEM)

In 1998, the NSIFS technical committee identified the need to find a faster more cost-effective method to ecologically map the Merritt TSA for use in wildlife, biodiversity, growth and yield, and inventory programs. NSIFS initiated a PEM project, which was one of the earliest projects in the province. Due to the lack of standards at the time, there were some deficiencies identified in the assessment procedures after the project was started. NSIFS worked with MOF Research Branch to address these deficiencies. MOF Research Branch accepted the modified methods as reasonable and approved the PEM for strategic use in timber supply analysis.

The PEM has been used specifically as an integral component to the site index adjustment project where preliminary estimates are statistically adjusted across the TSA, using the PEM map entities. PEM also has been used or is planned to be used in other processes such as old growth management area determination.

In consideration of the above, I accept the use of PEM to assist in determining site index estimates and environmental factors such as old growth management areas and deer winter range. I am mindful that PEM is a strategic level tool and there is variation and

uncertainty around the PEM predictions that will influence site index and environmental predictions.

Landscape level biodiversity

In the TSR 2 assumptions only old seral guidelines were modelled using an average old seral prescription across all landscape units. Old seral forest targets were based on the landscape unit planning guide, and reduced to 1/3 and 2/3 for low BEO landscape units in the first and second rotations. In the TSR 2 AAC rationale, the chief forester acknowledged that the use of average old seral requirements might not reflect the real impact of managing landscape units according to a given emphasis. He also acknowledged that once old growth management areas (OGMAs) are delineated, the timber supply impact may be greater than currently indicated, however, no adjustment was made in timber supply. The chief forester also acknowledged the assumption that forests outside the THLB continue to age, was an optimistic assessment and assigned a 5% reduction in future timber supply.

The innovative practice undertaken by NSIFS was the development of draft OGMAs towards meeting landscape level biodiversity requirements. NSIFS analyzed the timber supply impacts through the identification of potential OGMAs completed on four landscape units in the Merritt TSA. The modelling of the selected OGMAs in the four landscape units resulted in a 3.2% impact on the THLB. NSIFS then applied a general reduction of 3.9% on the remaining landscape units in the Merritt TSA.

Many comments and concerns were expressed about the methodology and results of the project completed by NSIFS. Ministry of Water Land and Air Protection (MWLAP) and MSRM staff expressed concern that the method used by NSIFS was insufficient to capture the full impact of the OGMAs that could be placed in the Merritt TSA. MWLAP expressed concerns regarding the long-term recruitment from the non-THLB, final BEO assignment, and applicability of 3.9% to the remaining eight landscape units. MWLAP do not believe that the information provided to date provides the rationale to support the statement that "all environmental objectives can be met with a netdown of 4% or less" and that the assumption is a high risk. More recent summaries suggest higher impact in some of the four landscape units modelled.

MWLAP provided an Environment Risk Assessment (ERA) that demonstrates a high to moderate risk to old forests under current practice in the Merritt TSA. Old forest is considered an indicator to the environmental condition and if sufficient old forest is not present it increases the biological integrity of the management unit. While recognizing the assessment of old forests is used as an indicator and is not judging the landscape level biodiversity guidelines (LUPG), I must be mindful that the LUPG is representative of current policy with respect to old forests.

OGMAs have not yet been designated by MSRM for the Merritt TSA. Currently, MSRM, Cascades forest district, First Nations, and NSIFS consultants are working together to

spatially locate OGMAs. Concerns were expressed that the selection criteria for OGMAs requires more emphasis with regards to key ecological principles and there is a need to demonstrate improved representation of current practice than those used in the previous timber supply review. No disturbances were considered to occur in the non-timber harvesting landbase in the TSA-like or IFPA-like analysis. As previously noted the chief forester considers the implications in his recent determination to have a 5% long-term impact.

As compared to the previous timber supply review assumptions using the landscape unit planning guide, the modelled OGMAs result in no short-term impact, a loss of 5 615 m^3 in the mid-term and 53 097 m^3 in the long-term. The use of 3.9% across all landscape units results in a short-term loss of 71 413 m^3, mid-term of 60 225 m^3 and long-term of 90 555 m^3.

I am aware that work has continued on modelling OGMAs after the submission of the uplift application. The NSIFS consultant performed an oldest first basecase (Landscape Unit Planning Guide) run and arrived at a 10.6% THLB impact within the Merritt TSA. The consultant has also performed an innovative run that identified a 4.2% THLB impact. MSRM staff have concerns about the methodology used in the latter as it involved transfer of some of the THLB OGMAs to areas outside the TSA, such as Manning Park. MSRM does not accept this transfer of approximately 1% and feel that the starting point for OGMA discussions should be 5.2% of THLB. There is also concern that the "low risk Lodgepole pine" stands were not identified as OGMA candidates in the timber supply analysis and there is now an effort to reconsider some of these stands for OGMA. MSRM believe that due to high operability, timber, biological, and First Nations interests it will be difficult to achieve a 5.2% impact and feel it is more realistic to expect an impact of 7.9% of THLB.

In consideration of the above, I accept the modelled scenario for use in the composite analysis. However, I am mindful of MSRMs concerns that the impact for OGMAs will be significantly higher than modelled and MWLAP's concerns and assessment about the risks of not maintaining sufficient old forest in certain BEC variants. I recognize that ageing of the non-THLB can impact long-term timber supply in all scenarios and such impacts may have short-term implications where the flexibility of the timber supply is low.

I will discuss my accounting for this factor under 'Reasons for decision'.

Stand level biodiversity

TSR 2 accounted for wildlife tree patches (WTPs) using both area exclusions and volume reductions. Approximately 2% of the timber harvesting landbase was excluded to account for existing WTPs > 2 ha. in size, and a 2% volume reduction was applied to all stands (existing and future yields) to account for WTPs < 2 ha. In the TSR 2 AAC rationale the chief forester concluded that the modelling assumption of 50% of WTP requirements

could be met outside the timber harvesting landbase, was optimistic and underestimated the actual WTP impact, given the high degree of THLB in the Merritt TSA. A further 1.5% reduction to the short-term harvest level was applied for a total of 5.5% in the AAC determination.

NSIFS identified the minimum amount of timber harvesting landbase required to fill deficiencies in wildlife tree patch requirements based on a guidebook recommendation of 500 metres between patches. This modelling exercise identified a 1.12% timber harvesting landbase requirement for wildlife tree patches. MOF Cascades forest district staff, MWLAP, and MSRM indicate that based on their knowledge of current practices that this is a low value. Cascades forest district staff acknowledge that the 5.5% recognized in the previous AAC determination is more appropriate.

The NSIFS analysis considered all non-timber harvesting landbase to be suitable for wildlife tree retention, thus overestimating the amount of WTPs within non-THLB and underestimating the WTP needs in the THLB. Further, NFSIS did not discuss how the wildlife tree retention of 1.12% that they modelled was to be operationally implemented.

The requirement for more wildlife tree retention would result in less landbase. As such the yield associated with the IFPA (e.g. inventory and site index) cannot be captured from these lands. These changes would impact both the TSA-like and IFPA-like scenarios.

I will discuss my accounting for this factor under 'Reasons for decision'.

Identified wildlife management strategy

In the TSR 2 AAC rationale the chief forester acknowledged that it was reasonable to expect future measures to protect additional habitat for identified wildlife. In recognition, the chief forester applied a 1% reduction in harvest level across all planning horizons. This 1% has been recognized in the identified wildlife management strategy as a planning threshold.

In the TSA-like analysis, a wildlife habitat area (WHA) of 60 ha. for tailed frogs was established and incorporated as a THLB area reduction. The same assumption used in the TSA-like analysis was repeated in the IFPA-like analysis. MWLAP expressed concerns that the application and analysis insufficiently addressed the needs for identified wildlife. Currently, there are 144 ha. of THLB that have been removed due to wildlife habitat area. It was also noted that the 1% limit was not applied. There is concern that the 1% will be reached in a short time if spotted owls are confirmed and WHAs for grizzly bears are established.

I will discuss my accounting for this factor under 'Reasons for decision'.

Riparian and temperature sensitive streams

In 2001, the NSIFS completed a stream classification model for the TSA. While this classification model has not been appropriately validated using an independent data set, MSRM has accepted the strategic use of the model. Revisions to the THLB netdown criteria were made based on riparian reserve zone and riparian management zone exclusions to all FRIM1 streams following best management practices from the riparian management guidebook. The new stream classification resulted in approximately 7,672 ha. less THLB exclusion than did the TSR 2 netdown process. Except for the increment related to other innovative factors (e.g. inventory, site productivity), the impact of increasing THLB is not captured as an innovative uplift.

The analysis did not model the additional impact of temperature sensitive streams, which was considered in the TSR 2 AAC determination to be approximately 1,000 ha. or 0.15% additional to riparian management guidelines.

In consideration of the above information, I accept the modelled riparian management area information as better information. I will discuss my accounting for this factor under 'Reasons for decision'.

Deer winter range (DWR)

Updated deer winter range mapping and implementation have not been completed. NSIFS have modelled assessment units and management zones developed jointly with MSRM and MWLAP. As planning cells are not yet determined, NSIFS used Okanagan-Shuswap LRMP management objectives at the assessment units level in the innovative analysis. MWLAP has expressed concerns that the application of management objectives at the planning cell level will be more constraining on timber supply. There are also concerns from MWLAP that ungulates, such as moose, not modelled in TSR 2 or the IFPA-like analysis may have an impact on harvest flow.

In consideration of the above, I accept the deer winter range mapping as improved information. I will discuss my accounting for this factor under 'Reasons for decision'.

Visually sensitive areas

Updated scenic areas with visual quality objectives have been approved in the Merritt TSA since the NSIFS submitted their AAC increase application. Notification by the district manager on September 30, 2003 identified that the new scenic areas and visual quality objectives would become effective in four months. The updated scenic areas contain about 20% more area than was modelled. Under the base TSA-like harvest flow, estimates of the impact were likely less than 10 000 m^3 per year. However, under higher harvest flow of the innovative practices scenarios the impacts could be greater.

I will discuss my accounting for this factor under 'Reasons for decision'.

Cultural heritage resources

Under the *Forest Act*, a cultural heritage resource means 'an object, a site or the location of a traditional societal practice that is of historical, cultural or archaeological significance to British Columbia, a community or an aboriginal community'. Archaeological sites contain physical evidence of past human activity, whereas traditional use sites may not necessarily contain historical physical evidence but may indicate current use by First Nations. Archaeological sites that predate 1846 are protected under the *Heritage Conservation Act*. The nature and extent of required protection of archaeological sites are detailed under this legislation.

Incorporation of First Nations' values and locally significant plant information is a high priority of the NSIFS and I am aware that Bands within the Nicola Tribal Association (NTA) and the Upper Similkameen Indian Band are currently undertaking projects related to First Nations' resource interests and values. However, as the information on First Nations' values is not yet complete, I accept that the IFPA-like analysis does not incorporate any values beyond that included in TSR 2.

I am mindful of the relationship that has been established between the IFPA-holders and First Nations and the commitment to work with First Nations operationally to ensure that cultural heritage resources are properly managed. I am also mindful that completion of the initiated and proposed projects will result in identification of further First Nations' interests and values. Should additional cultural heritage sites be identified in the future, they should be brought to my attention and accounted for in future determinations. For this determination, I am satisfied that, at the time, the analysis assumptions were based on the best available information for cultural heritage resources and make no adjustments on this account.

Harvest flow

Large timber volumes in older forests often enable a variety of short-term harvesting levels without jeopardising the long-term sustainable timber supply. These alternative harvest flows may have a decline to a long-term level, an even flow or step up to a long-term level or even a decline to a level below the long-term before stepping up to the long-term level.

The chief forester in his memo on timber supply analysis methodology suggested selecting, if relevant, a 'base case' harvest flow that reflects the harvest flow used in the timber supply review base case. In the most recent Merritt TSA timber supply review, the timber supply analysis base case showed, after an initial five year beetle uplift, a harvest flow maintained for six decades after which the mid-term declines 9% per decade for three decades before reaching the long-term level.

Consistent with advice in the chief forester's memo on timber supply analysis methodology, the IFPA-holders have used a declining harvest flow that reflects the timber supply review base case. While the analysis is unable to maintain initial harvest flow for six decades, I find the harvest flows modelled reasonable for determining an increment associated with the innovative forestry practices.

However, I also recognize that the IFPA-like analysis that includes all the innovative practices and activities shows little flexibility in the availability of merchantable stock throughout the planning period. This raises concern that there is the potential of mid-term shortages caused by increased short-term harvesting if managed stand growth is slower than modelled.

I will discuss this factor further under 'Reasons for decision'.

Impacts on other licensees

Under my guiding principles, I identify that an AAC increase decision should have no impact on non-IFPA holder's rights. The NSIFS has the support of the following smallwood licensees currently operating within the Merritt TSA with respect to management and any increase in allowable annual cut:

Princeton Wood Preservers Ltd. - NRFL A55527
Qwa'eet Forest Products Ltd. - NRFL A55525
Mego Wood Products Ltd. - NRFL A55528
Nicola-Pacific Forest Products Ltd. - NRFL A55524.

The only smallwood licensee not to respond to the NSIFS was the Princeton & District Community Forest Corporation (NRFL A55529).

In addition, the B.C. Timber Sales Kamloops Business Area (formerly the Merritt Forest District Small Business Forest Enterprise Program) was involved in the original application and agrees to work with the IFPA-holders to plan management activities that may become eligible through the implementation of the IFPA.

Acknowledging the economic considerations that are prevalent in harvesting smallwood, it is my expectation that the non-IFPA licensees will co-operate in the management outlined within the forestry plan and identified in the IFPA review analysis, and that such agreement satisfies my principle of minimal impacts on other licensees.

The NSIFS in consultation with the MOF, estimated prior to the IFPA review analysis that the current AAC allocation for the Merritt TSA is 1 508 050 m^3/year. This includes 1 195 550 m^3/year of conventional and 312 500 m^3/year of small diameter pine volume. The volume of the two partitions is apportioned as follows: 1 025 644 m^3/year for replaceable forest licences, 212 500 m^3/year for non-replaceable forest licences,

208 238 m^3/year for BCTS timber sale licences, 35 000 m^3/year for BCTS non-replaceable forest licences, 4 200 m^3/year for woodlot licences and 22 468 m^3/year in the forest service reserve.

In my considerations under the Section 59.1 of the *Forest Act* I am not responsible for determining the total allowable annual cut for the IFPA pilot area (which encompasses the Merritt TSA). My responsibility relates solely to determining an allowable annual cut increase resulting from innovative forestry practices or activities. As such my reasons for decision will focus on an allowable annual cut increase.

First Nation considerations

The Nlaka'pamux and Okanagan Nations have traditional territories within the IFPA area. The IFPA area covers the following six communities; Coldwater Band, Lower Nicola Band, Nooaitch Band, Shackan Band, Upper Nicola Band and Upper Similkameen Band. Five other First Nations' communities located outside the IFPA area have reserves and/or traditional interests within the IFPA area. These are the Westbank First Nations (Westbank), Lower Similkameen Band (Keremeos), Nicomen Band (near Spences Bridge), Cook's Ferry Band (Spences Bridge) and the Siska Band (near Lytton).

The First Nations' communities in the Merritt TSA have been involved in the NSIFS since the original application. The Nicola Tribal Association (NTA) and Upper Similkameen Indian Band have representation on the board of directors, the technical committee and have interest in IFPA-holder Stuwix Resources Ltd. The goal of the First Nations program is strategic goal #3 of the Forestry Plan, which is to support First Nations' communities by:

- Collecting, documenting and making available through data management protocols the cultural inventory information of First Nations' communities.
- Building the technical capacity of the First Nations' communities to allow them to capture employment opportunities and participate in the management of the resources of the TSA.
- Obtaining more direct involvement in the control and management of natural resources and ensure that forest development protects and respects First Nations' heritage, traditional practices and culture.
- Identifying and developing long-term meaningful employment and training opportunities.
- Obtaining a share of the benefits of any increase in the AAC.

In addition to First Nations' direct involvement, I am aware of the following;

- The MOF regional office initiated First Nations consultation with respect to the application in August 2002 via a letter request about the application. For consultation with regards to an AAC increase associated with an IFPA, the following First Nations' associations and bands were contacted; Nicola Tribal Association,

Coldwater Indian Band, Cook's Ferry Indian Band, Lower Nicola Indian Band, Upper Similkameen Indian Band, Siska Indian Band, Upper Nicola Indian Band, Westbank First Nation, Lower Similkameen Indian Band, Nicomen Indian Band, Nooatich Indian Band, Shackan Indian Band.

- The following correspondence was sent to the above First Nations associations and Bands:
  August 28, 2002 letter from the regional manager requesting comments and input on the AAC increase application.
  November 7, 2002 letter from the regional manager requesting information relating to potential aboriginal rights and title interests in Merritt TSA in relation to the IFPA.
  May 22, 2003 and June 12, 2003 letters from Fred Baxter regarding the IFPA AAC increase application and invitation to a June 26, 2003 workshop at the Best Western Nicola Inn, Merritt, B.C.

- The following meetings were held with First Nations to discuss the Merritt IFPA:
  June 20, 2003 meeting between David Walkem and the regional manager.
  June 26, 2003 Workshop at Best Western Nicola Inn, Merritt regarding First Nations' interests and the Merritt IFPA AAC increase application.
  July 23, 2003 meeting between the Lower Nicola Indian Band and the regional manager.

- Letters of conditional support of the application and understanding of the share agreement were received in September 2002 from Nicola Tribal Association, Cook's Ferry Band, Nooaitch Indian Band, Shackan Indian Band, and Coldwater Indian Band.

- A letter regarding concerns on rights and title was received from Westbank First Nations on November 18, 2002.

- A letter from David Walkem, President, Stuwix Resources Ltd. dated August 18, 2003 to the regional manager regarding clarification of the share agreement.

- A letter from Hans deVisser, Chair, NSIFS, dated October 8, 2003 to the regional manager regarding clarification of First Nations involvement.

- A letter outlining the nature of Aboriginal Title and Rights within the Okanagan Territory and concerns regarding the proposed AAC uplift within Okanagan Territroy was received from the Okanagan Nation Alliance on October 15, 2003. The letter emphasizes that the decision regarding the proposed uplift should not proceed until after the Crown has taken the necessary steps to consult with the Okanagan Nation, including substantively addressing concerns and accommodating interests.

- A letter from David Walkem, President, Stuwix Resources Ltd. dated October 31, 2003 to the regional manager outlining: the companies' position on the arrangement

between Aspen Planers Ltd. and Weyerhaeuser Canada Ltd.; concerns regarding the companies' immediate access to cutting permits; and the companies' arrangement with Ardew Wood Products Ltd.

Considering the above information from First Nations consultation, I have concluded the following:

- I am satisfied that the Provincial Policy for Consultation with First Nations has been adhered to. Reasonable opportunities have been made to the First Nations Bands to make direct presentation about the IFPA Forestry Plan and the AAC increase application and that the NSIFS is highly aware of the need to consider First Nations' interests.

- I have considered the issues and materials presented to me by First Nations and have put my mind to the specific concerns identified.

- The potential rights and title of First Nations in the Merritt TSA introduces uncertainty into my determination. However, the nature, scope, and geographical location of the potential rights and title and how they would impact my determination of an AAC increase are not known to me. As such, I make no adjustments related to this uncertainty.

I have also concluded that the following reflects an offer of 'reasonable economic accommodation'.

- Knowledge of the proposed 50/50-share agreement between the major licensees and Stuwix Resources Ltd. reflects the stated interests of First Nations and reasonable accommodation of those interests.

- The commitment made by licensees, with the exception of Aspen Planers Ltd., to develop a Jobs Plan that will offer First Nations;
    - 50% of the incremental harvesting and silviculture jobs/contracting opportunities that are directly related to the uplift timber volume harvested under the Merritt TSA IFPA.
    - 50% of the employment associated with activities directly related to the business of the NSIFS related to the implementation of the IFPA workplan.

- All First Nations who have traditional territory within the Merritt TSA have been offered a Forest & Range Agreement triggered by the consultation over the Douglas Lake Ranch change of control request to the Cascades District Manager. The offer seeks to address a workable accommodation of individual Band's asserted aboriginal interest and any potential infringements as a result of on-going forest and range development activity over the next five years that may occur within the individual Band's traditional territory. The offer will also address First Nations' interests respecting the consent to a change in control of the Douglas Lake Cattle Company.

I also have concerns that individuals of many First Nations bands may not be familiar with the governance relationships within and between NSIFS and Stuwix Resources Ltd.

If information becomes available during the term of this AAC increase that concerns potential rights and title of First Nations in the Merritt TSA, I may re-visit this determination.

I also reiterate that the AAC increase that I may determine should not in any way be construed as limiting obligations under recent British Columbia Court of Appeal or the Supreme Court of Canada, and in this respect it should be noted that my determination does not prescribe a particular plan of harvesting activity within the Merritt TSA. Further my decision does not affect obligations with respect to referrals on harvest operations.

Reasons for decision

In reaching my decision on a request for an increase in allowable annual cut to the forest licences held by the six IFPA-holders, I have considered all of the factors presented to me, and I have reasoned as follows.

An increase in allowable annual cut is based upon the increment in short-term harvest flow attributable to the innovative forestry practices and activities. These innovative forestry practices and activities are identified in the forestry plan, that I have previously approved, and have been or are being carried out by the IFPA-holders in accordance with the forestry plan.

Section 59.1 of the *Forest Act* requires that I justify an increase in allowable annual cut based on timber supply analysis methodology approved by the chief forester. The chief forester in his timber supply analysis considerations for IFPAs identifies the types of information that should be included in an analysis. I have reviewed factors related to the land base an inventory, growth and yield, and management objectives and I am satisfied that the majority of the assumptions appropriately reflect the best available information and current practices. I have identified a number of forest management or data issues that either cause uncertainty or lead to changes in analysis assumptions relative to the TSA-like analysis or IFPA-like analysis. Some of these factors can be quantified and their impacts assessed with dependability. Other factors may influence the timber supply by adding an element of risk or uncertainty to the decision but cannot be reliably quantified at the time of this determination.

The following is a summary of the factors that I consider require an adjustment to the base AAC increase request of 549 000 m^3. The adjustment to the base AAC increase request may be upward or downward based on the results of the innovative practices identified in the IFPA application and my determination of the level of risk and uncertainty with each factor. Factors with uncertainty that were discussed previously in my consideration but do not influence the existing AAC are not discussed below.

Adjustments to the base AAC increase

(1) *TSA Boundaries:* The Merritt TSA boundaries have been refined since the 2001 timber supply review and are known to be approximately 901 ha. larger in gross area (information from MSRM). The increase impacts both the TSA-like and IFPA-like scenarios. The likely AAC increment change ranges from 0% to 0.13% based on the increment associated with yield. The exact change is unquantified, as the amount of new area in the timber harvesting landbase is unknown. I have therefore determined that the increase is equal to a very small unquantified upward pressure on the base AAC increase request.

(2) *Woodlots:* I recognize that there is a small (<0.03%) downward impact on the increment attributable to the 205 ha. more gross area than in the NSIFS analysis. The result is a small unquantified downward pressure on the base AAC increase request.

(3) *Forest Inventory:* I have decided that the use of the 6% increase in inventory is reasonable based on the VRI Phase II information provided and expert staff opinion and accept the base AAC increase as modelled. This decision recognizes some incompleteness and uncertainties around the potentially "conservative" 6% estimate but assumes the positives and negatives balance. I have questioned why the Fraser Protocol adjustment process, which is considered standard procedure, did not produce reliable results. I have chosen to address this uncertainty by requesting that the IFPA-holders work with MSRM to identify and document the deficiencies with the Fraser protocol adjustment in the Merritt TSA. If the documentation presents new information that is contrary to accepting a 6% increase in inventory, I may revisit this decision.

(4) *Site Index – Even-Aged Stratum (low elevation):* I accept the work completed by NSIFS on site productivity in the low elevation even-aged stratum as improved information. I am mindful of the concerns raised about the sample population and that a large portion of the short-term harvest flow increase is the result of improved predicted yields in the mid- and long-term. These factors present some uncertainty and risk for which I feel that I must account. As such, I will reduce the base AAC increase request by 21 000 m^3 per year.

(5) *Site Index – Even-Aged Stratum (smallwood):* I accept the analytic review of site productivity in the smallwood stratum as a further indication that site productivity in the smallwood even-aged stratum are likely higher than current forest cover inventory estimates. However, agency staff have identified several concerns related to sampling methodology, portability of low elevation data, economics of harvesting smallwood, IFPA-holders without the harvest rights to this stratum, and future site productivity gain dependent on non-IFPA licensees. Based on these concerns, I recognize that more work is required to obtain defensible site productivity estimates in this stratum. NSIFS noted that the smallwood impact contributes to the mid- and long-term harvest flow increases. I expect that these

increases in conjunction with productivity increases in the low elevation stratum contribute to the short-term flow by enabling the more rapid harvest of existing stands. Recognizing the need for further study and the uncertainty remaining around site productivity in this stratum, I cannot credit the IFPA-holders entirely for a short-term increase possibly attributable to this innovative activity. Therefore, I will reduce the base AAC increase request by 80 000 m^3 per year.

(6) *Single Tree Selection*: The AAC increase application raised concerns that the presented modelling of single tree selection underestimated the harvest flow contribution from this stratum. However, I find the supporting documentation insufficient to judge both the growth and yield model SINGROW (i.e. lack of validation or peer review of model and yields) and the CASH6 application. Further, there is also no information on the possibility or amount of harvest that could be flowed into the short-term from mid-term and long-term impacts identified by this modelling activity. While I am mindful that it's likely this stratum has a higher timber supply contribution, I do not have sufficient information to quantify an upward pressure.

(7) Landscape Level Biodiversity: I accept the scenario modelled for use in the composite analysis but conclude that there is a great deal of uncertainty about this factor. The methods used to model landscape level biodiversity impacts in the IFPA-like analysis have not been demonstrated to better represent current landscape level biodiversity practice than those modelled in the previous timber supply review. I am aware that MSRM, MOF district staff, First Nations and NSIFS consultants are currently working on a process to establish OGMAs within the TSA. I am mindful of MSRM's concerns that the impact for OGMAs will be significantly higher than the percentage modelled and MWLAP's concerns regarding the Environmental Risk Assessment in the Merritt TSA. The implication is that a reduction of 3.9% in THLB for OGMAs represents a short-term reduction of 71 413 m^3 per year (as modelled in scenario 1.1). A higher percentage reduction in THLB, such as the 7.9% estimated by MSRM, would represent an even higher short-term reduction. Given that I have not viewed the new analysis work and a great deal of uncertainty still remains, I have chosen to reduce the base AAC increase request attributable to this factor by 71 000 m^3 per year. As a condition, NSIFS must work with MSRM, MOF, MWLAP, First Nations and others to complete the landscape level biodiversity plans within one year of this determination. NSIFS is to submit the completed plans and updated analysis identifying impacts to the regional manager at which time the decision on this factor may be revisited. The completed plans and information on their implementation should also be contained in subsequent AAC determinations.

(8) Stand Level Biodiversity: I conclude that the 5.5% recognized in the previous AAC determination is more reflective of current practice with regards to wildlife tree patch retention. In addition, the IFPA-like analysis considered all non-THLB to be suitable for wildlife tree retention thus overestimating both the amount of wildlife tree patch within non-THLB and thus the inter-patch availability in the non-THLB.

The impact is that the requirement for more wildlife tree retention than modelled will result in less landbase and individual tree growth than the IFPA-holders can consider capturing with yield increases identified by the innovative forestry practices (e.g. inventory and site index projects). I have determined that the impact for stand level biodiversity is an additional reduction of 22 600 m^3 per year to the base AAC increase request.

(9) *Identified Wildlife Management Strategy:* I conclude that the application of the provincial planning threshold of 1% for Identified Wildlife Management Strategy is appropriate to apply in this decision. The impact of applying the 1% policy, as has been done in the recent AAC determinations, would be an equivalent timber harvesting landbase reduction of 1% less the 60 ha. considered in the analysis. Removing this area from the timber harvesting landbase in all scenarios results in a reduction of 5 200 m^3 per year to the base AAC increase request.

(10) *Riparian and temperature sensitive streams:* I acknowledge that the IFPA-holders have provided an improved estimate of riparian management areas over that presented in the last timber supply review. Although the stream classification model is identified as an innovative activity, the analysis did not capture fully the increment associated with this activity. The improved stream classification information resulted in a 7 872 ha. increase in THLB that had been netted out in the previous timber supply review but only the increment related to other factors (e.g. inventory, site productivity) was considered for the innovative uplift. However, I am mindful that the classification model has not been appropriately validated using an independent data set and that MSRM accepted only the strategic use of the model while questioning the operational use. To account for uncertainty in the model use I will credit only 50% of the observed gains or a base AAC increase request of 8 700 m^3 per year. I also conclude that temperature sensitive streams were not accounted for in the analysis, which was considered to be an impact of 1000 ha. less THLB in the previous AAC determination. Therefore, to account for temperature sensitive streams, I will reduce the AAC increment by 0.15% or 2 200 m^3 per year. The result is an increase of 6 500 m^3 per year will occur to the base AAC increase request from the innovative riparian modelling. I encourage NSIFS and the IFPA-holders to work on the validation of the modelling to capture the remaining potential increment.

(11) *Deer Winter Range:* I have concluded that the assessment units and management zones that NSIFS have developed jointly with MSRM and MWLAP represents much improved information. There is some uncertainty as planning cells have not been determined yet and there is a risk that the application of management objectives at the planning cell level will be more constraining on timber supply. To account for this uncertainty, I will reduce the base AAC increase request by 5 000 m^3 per year. This approval is conditional on NSIFS updating the timber supply modelling when new ungulate winter range mapping and management based on the planning cell level is established.

(12) Visually Sensitive Areas: The recently updated and approved scenic areas with visual quality objectives in the Merritt TSA will likely impact on harvest flow. The impacts of an additional 20% more scenic areas is not fully known at this time under the innovative analysis but it's likely to be a greater impact under the more constrained innovative analysis. As such I consider that the updated scenic areas and visual quality objectives represents a small unquantified downward pressure on the base AAC increase.

(13) Harvest Flow: I am concerned about the lack of flexibility in the availability of merchantable stock throughout the planning period as shown in the IFPA-like analysis. Further, there is MWLAP's concern of increased risk as identified in the Environmental Risk Assessment for the Merritt TSA if higher harvest of old forests occur. Also, I recognize that harvesting more in the short-term has the potential to push other current management objectives to their limits and that there would be little flexibility in the future to adjust for changes in other management objectives. I have chosen to account for some of this risk and uncertainty by reducing the base AAC increase request by 20 000 m^3.

There are factors that cause uncertainty in the analysis (e.g., spatially explicit adjacency) for which I do not have quantified information to estimate the impact on the base AAC increase request. Some of these factors may favour an AAC increase while others may not. I am mindful of the constrained nature of the analysis in the short-term and the implications of an AAC increase. Similarly, I am mindful of the large inventory that is present in the short-term, the nature of volume-based tenures, and the economic and social objectives of the crown as expressed to the chief forester. For this decision, I am assuming that these non-quantified factors balance.

In summary, I am satisfied that the information provided with the application is sufficient for me upon which to base a decision about an AAC increase.

Determination and conditions

I have reviewed and considered all the factors and the associated uncertainties described in this document. I determine that innovative forestry practices or activities under the IFPAs provide 330 700 cubic metres per year from within the Merritt IFPA boundaries that would not have been known or made available within the current allowable annual cut for the Merritt TSA.

With respect to the increases in AAC assigned to individual Forest Licences, I am aware of the subsidiary agreements that exist between Aspen Planers Ltd. and Weyerhaeuser Canada Ltd, and between First Nations and licensees with respect to a Jobs Plan. I will allow these subsidiary agreements to be implemented by the IFPA-holders but will not include them in my decision.

As per the share agreement between IFPA-holders, Stuwix Resources Ltd. is awarded 50% of the AAC increase. It is reasonable to conclude that the remaining 50% increase should be awarded proportionate to the existing AAC held by the IFPA-holders and B.C. Timber Sales. Although B.C. Timber Sales has been an integral part of the Merritt IFPA, there remains no legal vehicle to award an IFPA AAC increase directly to the program. Therefore, this volume should be considered a Crown asset and allotted to fulfil the social and economic objectives of the government. In consideration of the many options and consistent with government objectives, I have chosen to award additional volume to Stuwix Resources Ltd. and Ardew Wood Products Ltd. It is recognized that Ardew Wood Products Ltd. assisted First Nations by transferring a portion of their forest licence and has made a significant socio-economic contribution to the community in doing so.

Therefore, based on the considerations outlined, I will increase the allowable annual cut assigned to the following Forest Licences as follows:

A18695 – Aspen Planers Ltd. by 16 535 cubic metres per year;
A18696 – Tolko Industries Ltd. by 36 377 cubic metres per year;
A18697 – Riverside Forest Products Ltd. by 3 307 cubic metres per year;
A18698 – Weyerhaeuser Canada Ltd. by 76 061 cubic metres per year;
A18039 – Ardew Wood Products Ltd. by 19 015 cubic metres per year; and
A65006 – Stuwix Resources Ltd. by 179 405 cubic metres per year.

The award is subject to the conditions below:

(1) Documenting and providing a summary of all work completed in the forestry plan and providing copies of associated data and resulting information to the regional manager;

(2) holding an information session for all bands with interests in the Merritt TSA to explain governance relationships between the NSIFS and Stuwix Resources Ltd and the planning process that will be used to incorporate First Nations' traditional cultural and heritage interests;

(3) providing a detailed peer reviewed monitoring plan and implementation schedule. This will be submitted within six months of the award of an AAC increase and the plan shall be initiated within 12 months;
- The plan should include a growth and yield monitoring program that will identify deviations from expected overall average site productivity estimates, including low elevation, high elevation, and smallwood stands;
- The plan should monitor information to enable comparison of past and recent silviculture and harvest regimes with the regimes modelled in the current AAC increase application and for use in future analyses.
- The plan should provide a tracking mechanism to identify that First Nation employment commitments are being met.

(4) identifying and documenting the deficiencies in the Fraser protocol adjustment derived by NSIFS in the Merritt TSA;

(5) completing landscape level biodiversity plans with responsible government agencies and submitting an updated analysis complete with impacts to the regional manager within 12 months of the award of an AAC increase;

(6) updating of the deer winter range mapping. If additional increment due to this innovative practice is available, based on approved winter range boundaries and management objectives, NSIFS can identify this increment in future AAC increase requests. The proportion of work completed by government agencies relative to NSIFS should also be identified;

(7) within three months of the effective date of this determination providing a written response to the regional manager on how the above conditions are to be addressed and a timeline for their completion.

This determination is effective January 1, 2004. Due to the uncertainties and risks as previously discussed, this AAC increase will remain in effect until December 31, 2007. Nevertheless, if prior to the March 24, 2008 expiry date of the IFPA agreements, the IFPA-holders present significant new information within an amended forestry plan, or if I find any information or condition upon which this decision is based, is not justified I am prepared to re-visit this decision.

Recommendations

The review of information in support of an AAC increase determination provides me with the opportunity to make recommendations on several issues. These recommendations are intended to reduce the uncertainty and risk associated with future determinations and to ensure the intent of the forestry plan is met. I recommend that the IFPA-holders:

- follow-up on all activities identified in the forestry plan;
- complete a new forestry plan to replace the current multi-document forestry plan that expires in June 2004;
- continue to work to improve the forest inventory in the Merritt TSA including the completion of Local Net Volume Adjustment Factor sampling;
- continue to obtain improved site productivity estimates across the entire productive forested land base for all major species;
- provide a complete and reasonable description and validation documentation for any model used in future applications;
- provide greater explanation of timber supply dynamics in future timber supply analyses;
- provide sensitivity analyses of different harvest rules and priorities in future timber supply analyses;

- provide sensitivity analyses of major changes in forest management regime in future timber supply analyses;
- provide a detailed description of the calculations used to determine genetic gain in future analyses;
- explicitly include the higher utilization levels of smallwood in future timber supply analyses;
- complete or initiate the forest health activities identified in the forestry plan and where possible the information and associated modelling should be made available for the next timber supply review;
- improve upon the documentation of objectives and methods used to determine OGMAs;
- work with MWLAP in the development of appropriate environmental risk assessment indicators for use in future analysis;
- work with MWLAP and MSRM in ensuring that future wildlife tree patch modelling is understandable and acceptable;
- improve information around retention levels in Douglas-fir with reserve systems;
- consider modelling/documenting the management of elk movement corridors in greater detail;
- improve information on community watersheds as recommended by the chief forester in the AAC rationale for TSR 2; and
- initiate and complete projects that result in the greater integration of First Nation's values and land uses and where appropriate incorporate into future timber supply analyses.

Fred Baxter
Regional Manager
Southern Interior Forest Region

December 19, 2003

Appendix 1: Section 59.1 of Forest Act

Innovative forestry practices

59.1 (1) For the purpose of improving the productivity of the forest resource, the minister, at his or her discretion, may enter into an agreement with a person referred to in subsection (2) to allow that person to carry out, subject to subsection (5) and the *Forest Practices Code of British Columbia Act*, one or more of the innovative forestry practices and other activities that are set out in a regulation made under subsection (4).

(2) For the purpose of subsection (1), the minister may enter into an agreement with a person who

(a) is the holder of a forest licence or other agreement that is entered into under section 12 and specified in a regulation made under subsection (4) of this section, and

(b) presents a written proposal for an agreement to the minister.

(3) An agreement under subsection (1)

(a) must be for a term not exceeding 15 years, and

(b) may include terms and conditions that

(i) the minister considers necessary to effectively carry out the purpose of the agreement and further the social and economic objectives of the government, and

(ii) are consistent with this Act and the regulations and the *Forest Practices Code of British Columbia Act*, and the regulations and standards made under that Act.

(4) The Lieutenant Governor in Council may make regulations specifying

(a) the innovative forestry practices and other activities that may be the subject of an agreement referred to in subsection (1), and

(b) the agreements entered into under section 12, the holders of which may enter into an agreement with the minister under subsection (1) of this section.

(5) A person may only carry out an innovative forestry practice or other activity referred to in subsection (1) if the person

(a) has prepared and obtained the regional manager's approval of a forestry plan that meets the requirements of subsection (6), and

(b) is carrying out the practice or activity in accordance with the plan.

(6) A forestry plan

(a) must contain a description of the management area where the innovative forestry practices or other activities will be carried out,

(b) must specify the particulars of the innovative forestry practices or other activities,

(c) must contain a description of how the innovative forestry practices or other activities will be carried out,

(d) must contain a schedule of when the innovative forestry practices or other activities will be carried out,

(e) must specify how the innovative forestry practices or other activities will contribute to improved productivity of the forest resource,

(f) must specify how the innovative forestry practices or other activities will justify an increase in the allowable annual cut of the participant's licence or agreement referred to in subsection (2) (a), and

(g) may include other terms and conditions that

(i) the regional manager believes are necessary to effectively carry out the agreement referred to in subsection (1), and

(ii) are consistent with this Act and the regulations and the *Forest Practices Code of British Columbia Act*, and the regulations and standards made under that Act.

(7) After approving a person's forestry plan, the regional manager may increase the allowable annual cut authorized in the person's licence or agreement referred to in subsection (2) (a) by an amount that is justified according to timber supply analysis methodology approved by the chief forester or the chief forester's designate.

(8) When the regional manager increases an allowable annual cut under subsection (7), the regional manager may limit the increase to a period of time, area of land and type of timber, and may make the increase subject to conditions.

(9) If an assessment of

(a) the innovative forestry practices or other activities being carried out under the forestry plan, or

(b) information that was not available at the time the regional manager increased the allowable annual cut under subsection (7)

indicates that all or part of the allowable annual cut increase was not justified, the regional manager may reduce the allowable annual cut of the licence or agreement referred to in subsection (2) (a) by an amount not exceeding the increase granted under subsection (7).

(10) If, with respect to an innovative forestry practice or other activity, a person is not complying with

(a) the agreement referred to in subsection (1),

(b) the forestry plan approved under subsection (5),

(c) any limitation or conditions imposed under subsection (8), or

(d) this Act and the regulations made under this Act, or the *Forest Practices Code of British Columbia Act* and the regulations or standards made under that Act,

the regional manager may do one or both of the following:

(e) suspend or cancel the agreement referred to in subsection (1) and sections 76 and 77 apply with respect to that suspension or cancellation;

(f) reduce the allowable annual cut of the person's licence or agreement referred to in subsection (2) (a) by an amount the regional manager determines is attributable to the default.

(11) A reduction under subsection (9) or (10) may be apportioned over a period of up to 5 years.

(12) If the forest licence, or other agreement referred to in subsection (2) (a), is suspended, the agreement under subsection (1) is suspended.

(13) If the forest licence, or other agreement referred to in subsection (2) (a), is cancelled or surrendered, the agreement under subsection (1) is cancelled.

(14) If the agreement referred to in subsection (1) is suspended or cancelled, the forestry plan is suspended or cancelled, as the case may be.

1996-11-9.

Appendix 2: Innovative forestry practices regulation

Definitions

1 In this regulation:

"Act" means the Forest Act;

"forestry plan" means a forestry plan required to be submitted for approval under section 59.1 (5) of the Act;

"forest practice" has the same meaning as in the Forest Practices Code of British Columbia Act;

"free-growing stand" has the same meaning as in the Forest Practices Code of British Columbia Act;

"holder" means a person that presents a written proposal for an agreement under section 59.1 (2) (b) of the Act;

"permanent access structure" has the same meaning as in the Forest Practices Code of British Columbia Act;

"standard practices" means the forest practices routinely applied by licensees in the timber supply area when the forestry plan is submitted or at any other time determined by the regional manager;

"stocking requirements" has the same meaning as in section 39 (1) of the Operational Planning Regulation, B.C. Reg. 174/95.

Authorized innovative forestry practices and activities

2 The innovative forestry practices and other activities that may be the subject of an agreement under section 59.1 (1) of the Act are the following:

(a) the implementation of harvesting methods or silvicultural systems that may

(i) increase the total amount of timber available to harvest in the timber supply area over the amount available under standard practices, or

(ii) reduce the loss of productivity associated with permanent access structures from the loss of productivity under standard practices for similar terrain and timber types in the timber supply area;

(b) activities that result in the establishment of free-growing stands on

(i) previously unforested areas,

(ii) areas that are below stocking requirements and are not part of the holder's free-growing responsibilities under section 70 (3) of the Forest Practices Code of British Columbia Act, or

(iii) areas that

(A) have stands of timber with repressed growth or that contain brush or species that are not commercially valuable, and

(B) are not part of the holder's free-growing responsibilities under section 70 (3) of the Forest Practices Code of British Columbia Act;

(c) silviculture treatments on free-growing stands;

(d) silviculture treatments on sites that are not free growing in order to produce stands that exceed current growth performance or standards achieved using standard practices for the timber supply area;

(e) the collection and analysis of new data, in accordance with the specifications of the chief forester, to provide a more accurate representation of the forest composition and its expected rate of growth compared to the rate existing when the forest plan is submitted or at any other time determined by the regional manager;

(f) activities that will enhance and protect other resource values, including, but not limited to, water, fisheries, wildlife, biological diversity, soil productivity and stability, forage production, grazing and recreation values.

Authorized forms of agreement

3 The holders of the following agreements under section 12 of the Act may enter into an agreement under section 59.1 of the Act:

(a) replaceable forest licences, and

(b) replaceable timber sale licences with an allowable annual cut greater than 10 000 cubic metres.

Appendix 3: Memorandum from chief forester on timber supply methodology

BRITISH COLUMBIA Ministry of Forests Chief Forester

MEMORANDUM

File: 19500-01/IFPA

April 6, 2001

To: Regional Managers

From: Larry Pedersen
Chief Forester

Re: Timber Supply Analysis Methodology Related to Innovative Forest Practices Agreements (IFPAs)

I am certain you are aware that the *Forest Act*, section 59.1, gives regional managers the responsibility for determining if increases in allowable annual cuts (AACs) for IFPA holders are justified. The *Act* requires regional managers to make their judgements according to a timber supply analysis methodology approved by the Chief Forester or the Chief Forester's designate. Attached to this memorandum is a timber supply analysis methodology to fulfill my responsibility under section 59.1 of the *Act*.

The methodology covers general analytical issues related to information needs, analysis outputs, links between AACs for IFPAs and TSAs, harvest flow, AAC increases, and legislation and policy. The method does not dictate the types of innovative practices that should or may be considered appropriate for approval as part of forestry plans, or for justifying AAC increases. Approval of forestry plans is clearly the regional managers' responsibility under the *Act*. Further, I believe that information and practices must be evaluated on their own merits within specific contexts; hence it would not be reasonable for me to prescribe evaluative criteria.

In the end, regional managers must make their own determinations based on analysis that provides insight on the full range of relevant factors, including the important risks and uncertainties. The analysis methodology is designed to assist in this undertaking.

The methodology should be included as an appendix to the Forestry Plan Outline to ensure the approach is clear to all government staff and external stakeholders. Please contact Chris Fletcher of Timber Supply Branch (250-356-5959, Chris.Fletcher@gems8.gov.bc.ca) with comments or concerns.

Larry Pedersen
Chief Forester

Attachment: Timber Supply Analysis Considerations for Innovative Practices Agreements

cc: Gary Townsend, Director, Timber Supply Branch

Ralph Archibald, Director, Forest Practices Branch

Henry Benskin, Director, Research Branch

Dave Gilbert, Director, Resources Inventory Branch

Dale Draper, Director, Tree Improvement Branch

Jim Langridge, Director, Resource Tenures and Engineering Branch

Drew Brazier, Resource Tenures and Engineering Branch

Timber Supply Analysis Considerations for Innovative Forest Practices Agreements

Section 59.1 (7) of the *Forest Act* allows regional managers, after approving an IFPA forestry plan, to increase the allowable annual cut of the holder's forest licence by an amount that is justified according to a timber supply analysis method approved by the chief forester or the chief forester's designate. The following discussion outlines the timber supply analysis method and allowable annual cut decision principles used by the chief forester.

The focus is on components and principles of timber supply analysis that are crucial in gaining an understanding of factors that determine timber supply in an area. Because of the complexities involved in determining harvest levels, it is not possible to develop precise procedures or simple calculations for timber supply analysis. The process can be guided by general principles—which are outlined below—however, the detailed aspects must be developed using case specific professional judgement. In this light, the following ideas are provided as guidance, not as firm procedural requirements that must be followed in all cases. While the general ideas apply in almost all cases, each case must be viewed as unique: some cases may require additional analysis to that outlined, while others may be assessed satisfactorily with less detail than suggested here.

If a timber supply analysis incorporates the types of information noted below, and facilitates evaluation of the considerations discussed, it will have followed a timber supply analysis method supported by the chief forester.

The chief forester's task under the *Forest Act* is to provide an analysis method, not to evaluate, or provide a method for evaluating information quality. Hence, the discussion here does not address information quality, rather it focuses on an analytical method. Nevertheless, the results of any analysis depend heavily on the quality of the information used in the analysis; that is, information about the forest land base, growth and yield, and management objectives. Evaluation of information quality must be done on a case-specific basis, which regional managers, in their evaluation of IFPA analyses, are best positioned to do.

Analysis should consist of clear descriptions of issues, information sources, assumptions, and any relevant data manipulations or adjustments related to the following three categories:

Land base:

- A tabular description of the categories of land and forest that are excluded from the timber harvesting land base, and the area excluded in each category. Such tabular descriptions are included in all timber supply analysis reports published for TSAs as part of the Timber Supply Review.
- A detailed description of the criteria employed in deriving the area included in the above table. This description should follow a format similar to the Information Package for Tree Farm Licence analyses.

- A description of the composition of the timber harvesting land base and the total forested land base in terms of species, site quality, stand age, and any other features relevant in the area.

Growth and yield:

- A description of the models and methods used in generating timber yield tables for existing and regenerated stands.
- The yield tables used for each species and site quality group and silvicultural regime.
- Detailed descriptions of methods and concepts underlying site productivity estimates and yield tables that reflect any planned innovative management.
- Notice of acceptance by appropriate BC Ministry of Forests staff of site productivity or yield estimates or adjustments corresponding to both baseline and innovative practices, and of any sampling or study methods related to deriving the estimates.
- MoF, Regional Growth and Yield Foresters will coordinate the growth and yield review process.

Management objectives:

- A description of the various management objectives that apply to the area and the methods used to represent actions used to achieve the objectives (e.g., silvicultural regimes, utilization levels, seral forest cover requirements, extended "rotations," alternative harvesting systems). The description should specify the component of the land base to which the objective applies; for example, timber harvesting land base, or Crown forested area. The template for Information Packages for Tree Farm Licence analyses provides a framework for organizing relevant information.

Analysis is facilitated if communication between relevant ministry staff and the agreement holders regarding land base, growth and yield, and management inputs occurs as early as possible in the analysis process.

Other considerations include:

Model review and benchmarking. There are no specific requirements or limitations on which analysis models may be used. However, interpretation of results and confidence that timber supply effects can be attributed to innovative practices rather than model differences requires a detailed understanding of assumptions made in the model about relevant processes and features. The best method of gaining this understanding is to benchmark the model with FSSIM, or other models used and understood by Timber Supply Branch staff. This is not to imply that FSSIM is a better model, or produces more accurate results than other models. It is simply the case that Ministry of Forests staff understands how FSSIM works, and can therefore use it as a basis for understanding how other models work. If the model to be used has not been reviewed and benchmarked by Ministry of Forests staff, the agreement holder should develop a review process in cooperation with Timber Supply Branch or a regional timber supply analyst. If the model being benchmarked produces different results from FSSIM (or other models used and understood by Timber Supply Branch staff), the agreement holder or its representative should be responsible for explaining the differences in detail in a technical document.

Even with a benchmarked model, the potential to increase harvest levels should be evaluated using the same model for both current and innovative practices. For example, a timber supply forecast corresponding to an innovative management regime and generated with a model other than FSSIM should not be compared directly to a forecast derived using FSSIM and the current management regime. Using results generated with the same model will help ensure any timber supply increase is based on management not model differences.

Results and reporting. The analysis report and related appendices should include sufficient output information to allow understanding of the main factors determining timber supply, and if applicable, reasons behind timber supply changes due to proposed innovative practices. Management, land base and growth and yield assumptions are to be documented in an Information Package. The timber supply analysis should demonstrate how these assumptions affect timber supply. The outputs should allow for examination of all relevant forest management objectives; for example, areas in seral stages by landscape unit, or area achieving visually effective green-up in visual management zones. Outputs related to timber inventory levels, areas and average volumes harvested, average age of harvested stands, and age class distributions over time all assist in understanding timber supply dynamics and evaluating the feasibility and realism of analysis results.

Sensitivity analysis. The analysis report must include results of sensitivity analyses that examine a reasonable range of uncertainty around management, land base and growth and yield assumptions and proposed innovative practices. The implications of changes in available funding to undertake planned innovative practice may be an important consideration for sensitivity analysis.

Operational feasibility. The analysis should examine any issues that may affect the operational feasibility of harvesting at the levels indicated. The most common issue involves the ability to locate harvest opportunities spatially.

Interactions between IFPA area and the TSA. IFPA timber supply analysis should demonstrate that any harvest level increases related to IFPAs will not disadvantage timber supply at the TSA level, or timber supply available to other operators in the TSA. An IFPA area may not be representative of the forest and management conditions for the TSA, and hence analysis results for the IFPA area should not be extrapolated and assumed to apply to the whole TSA.

Administration of IFPAs is the purview of the regional manager, and it is the regional manager's prerogative to require or request any analysis that s/he believes will assist in clarifying matters regarding IFPA AACs. It may be appropriate to investigate, using timber supply analysis, the advantages and disadvantages of different approaches to administering timber supply in the IFPA in the context of the TSA. For example, benefits may be gained by administering timber supply flexibly at the TSA level (e.g., allowing for harvesting of an IFPA increase from throughout the TSA not only the IFPA area) rather than combining timber supplies that have been assessed separately for spatial sub-units of the TSA. Ultimately, the regional manager will decide on the administrative approach, and the analysis must be consistent with that approach.

The intent here is to highlight that analysis must show that timber supply benefits for IFPAs will not come at the cost of supply at the TSA level or other operators in the area.

Harvest flow. Timber supply forecasts employing assumptions/estimates of both current and proposed innovative practices must follow reasonable flow patterns over time. In general, a reasonable flow pattern provides for a controlled and gradual transition from short-term to medium- and long-term harvests, and avoids large and abrupt disruptions in supply. Considerations include: rate of harvest level decline if any is necessary; the degree to which mid-term timber supply may appropriately drop below the long-term sustainable harvest level; and the timing of increase to the long-term sustainable timber supply if it is higher than mid-term levels.

A difference between mid-term and long-term levels may be justified because mid-term supply depends more on the existing stock of timber and the timing of availability of regenerated stands, while long-term timber supply is based on timber growth which is affected by site productivity and forest management practices. Maintaining mid-term levels above or equal to the long-term level could in some circumstances delay the achievement of, or lead to failure to achieve the maximum long-term level, or cause timber supply disruptions, because of limited supply of existing timber. Likewise, a decline in timber supply from a higher short-term supply to a lower mid-term may be appropriate if it can be shown that the associated harvests do not jeopardize or cause disruptions in long-term productivity.

The analysis should include different harvest flows that examine each of these considerations. A "base case" harvest flow for current practices must be chosen from the range of possibilities. The choice should be explained. In most cases this explanation can be brief, and consist primarily of reference to alternative harvest flow patterns. The IFPA base case harvest flow should reflect that used in the Timber Supply Review base case, if relevant. This will ensure that any change in short-term timber supply is due to changes in management, not harvest flow.

The analysis report should describe the criteria used to determine:

- the long-term harvest level and growing stock (criteria for sustainability);
- the harvest flow (e.g., maintain current harvest level for as long as possible, maximize volume harvested over a specified time frame, control the rate of decline);
- the minimum harvest level allowed in the medium term.

Allowable cut increases. Harvest forecasts for many management units in B.C. show declining timber supply over a period of decades. The general approach in cases of declining timber supply is that short-term allowable cuts are not usually increased unless there is a sound demonstrated forest management reason. This approach ensures that allowable cuts are not increased in the short term only to force reductions in the near future. There may be sound forest management reasons, such as existence of high risk of loss of stands to fire, insects or disease due to current or developing stand attributes (e.g., age or diameter distribution favourable to beetle attack, etc.).

An AAC increase in the short term should not decrease future timber supply below the levels forecast without the increase, unless there is a documented and compelling reason to do so.

The general approach described above for TSA and TFL AAC determinations with respect to potential increases leads to some issues for IFPAs. One of the explicit aims of the IFPA initiative is to allow AAC increases for IFPA holders. However, one stipulation of an increase is that other license holders will not be negatively affected by any AAC increases for the IFPA. In this context, important considerations in designing and interpreting an IFPA timber supply analysis would include:

- what are the forest management reasons that justify an AAC increase?
- what effects would an increase have on future timber supply?
- would a boost in AAC increase the sensitivity of future timber supply to uncertainties?
- if the forecast is for a temporary short-term increase (that is, timber supply is forecast to decline from the higher level) what actions will be taken to mitigate or avoid future socio-economic impacts? In other words: in the absence of a forest management objective for increasing the AAC, how will a temporary increase assist in strengthening the long-term role of timber harvesting and processing in the social and economic fabric of the area (capacity-building, diversification, etc.)?

Consistency with legislation and policy. The land base, growth and yield and management regime modeled in the analysis should be consistent with current legislation and policy. While the need for consistency with laws and policy is perhaps self-evident, it must be acknowledged that one of the goals of IFPAs is to move management in new directions. Therefore, it is imperative that modeling of proposed innovative management does not imply conflicts with legislation and policy. This analytical consideration differs from the approval of innovative management that is the regional manager's responsibility as part of forestry plan approval. The intent here is to highlight the need to evaluate analysis inputs and results to ensure that they do not create or imply conflicts. If a timber supply forecast is based on conflicts with designations or objectives that are the responsibility of other statutory decision makers under existing laws or policies, that forecast cannot reasonably be accepted as a basis for harvest level determination.

Relationship between chief forester (TSA) and regional manager (IFPA) determinations. The concern has been raised that AAC determinations for TSAs under Section 8 of the *Forest Act* may conflict in some way with AAC determinations for IFPAs. Communication between the chief forester and regional manager will be necessary to avoid discrepancies or conflicts regarding AAC determinations. It is not possible to generalize about the relationship between TSA AAC determinations and related to IFPAs given the diversity of timber supply conditions across the province.

A guiding principle for TSA and TFL AACs is that the determination should reflect current or reasonably foreseeable practices. Use of the preceding method and considerations should ensure that practices approved under IFPAs will constitute current or reasonably foreseeable management, and will be considered as such in TSA AAC determinations.

Documentation of decisions. Documentation of reasons for decision is useful to ensure the basis for the decision is clear and understandable. Further, both the regional manager and the chief forester have AAC determination responsibilities under the *Forest Act*. Reasonably detailed decision documentation, referring to the technical considerations discussed in this methods document, would help ensure consistency between regional manager and chief forester determinations, particularly when the time period between the decisions is long.

Appendix 4: Information Sources

Merritt IFPA

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- J.S. Thrower & Associates Ltd., Memo to NSIFS Technical Committee, Spatial Timber Supply Analysis Assumptions, December 19, 2002.
- J.S. Thrower & Associates Ltd., Memo to NSIFS Technical Committee, Spatial Timber Supply Analysis OAF1 Estimates, December 19, 2002.
- J.S. Thrower & Associates Ltd., Memo to NSIFS Technical Committee, Smallwood Site Index in Spatial Timber Supply Analysis, December 11, 2002.
- J.S. Thrower & Associates Ltd., Memo to NSIFS Technical Committee, Merritt IFPA Proposed Timber Supply Scenarios, January 7, 2003 (revised January 21, 2003)
- J.S. Thrower & Associates Ltd., Merritt TSA Predictive Ecosystem Mapping: Final Report, December 31, 2002.
- J.S. Thrower & Associates Ltd., Merritt TSA Predictive Ecosystem Mapping: Accuracy Assessment Report, December 19, 2002.
- J.S. Thrower & Associates Ltd., Natural and Managed Stand Yield Tables for the Merritt IFPA Innovative Analysis, March 31, 2003.
- J.S. Thrower & Associates Ltd., Site Index Adjustment for the Merritt IFPA Area – Final Report, March 17, 2003.
- J.S. Thrower & Associates Ltd., Site Index Adjustment for the Smallwood Population in the Merritt IFPA Area – Final Report, March 17, 2003.
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- Nicola-Similkameen Innovative Forestry Society, Summary of April 2002 Public Review.
- Nicola-Similkameen Innovative Forestry Society, Application for an AAC Increase for the Merritt IFPAs: Amendment to Forestry Plan #1, December 31, 2001.
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- Nicola-Similkameen Innovative Forestry Society, J.S. Thrower & Associates Ltd., Timberline Forest Inventory Consultants Ltd., Keystone Wildlife Research, NSIFS Forestry Plan #1, July 14, 2000.
- Nicola-Similkameen Innovative Forestry Society, letter to Regional Manager, Addendum to Forestry Plan #1, December 31, 2001.
- Nicola-Similkameen Innovative Forestry Society, Share Agreement, April 2, 2001.
- Nicola-Similkameen Innovative Forestry Society, Supporting Documentation for December 31, 2001 AAC Increase Application, April 30, 2003.
- Norgaard, Erik, President, Ardew Wood Products Ltd., letter to regional manager dated August 14, 2003, NSIFS AAC uplift application.
- Taylor, R.E., letter to regional managed dated January 21, 2002, re: Weyerhaeuser, Aspen Planer, and Ministry of Forests 1999 Letter of Understanding.
- Taylor, R.E. and H. de Visser, letter to regional managed dated December 17, 2003, re: Weyerhaeuser, Aspen Planer, and Ministry of Forests 1999 Letter of Understanding.
- Timberline Forest Inventory Consultants Ltd., NSIFS IFPA Innovative Timber Supply Analysis – Final Draft, April 30, 2003.
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Merritt TSA, Region, and District

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General

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